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FEED-LOT AND
RANCH EQUIPMENT
for
BEEF CATTLE



PRACTICAL EQUIPMENT which is more or less essential in the successful handling of beef cattle on the range and in the feed lot is discussed in this bulletin and illustrated by drawings and photographs.

Details concerning silos, barns, and concrete work which have previously been presented in other publications are not included, but reference is made to the publication containing such details.

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FEED-LOT AND RANCH EQUIPMENT FOR BEEF CATTLE¹

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SHEDS²

IN THE handling of beef herds primarily for the production of feeder cattle, and in the fattening of cattle for market, shelter should be provided that will give protection during severe cold and stormy weather. Beef cattle will withstand extremely cold weather if kept dry. Cattle having access to bedding, both under cover and in the open, frequently show a preference for the latter. Especially is this true during weather which may be extremely cold but dry and still.

Sheds with southern exposure provide satisfactory shelter for beef cattle in most instances. Figures 1, 2, and 3 show plans for a shed which is inexpensive and will serve the purpose very satisfactorily in any area, excepting where extremely low temperatures are reached. In the range country, especially in the colder regions, sheds similar to the one illustrated in Figure 4 are provided on improved stock farms producing purebred beef cattle for breeding purposes.

In addition to sheds about the headquarters, some ranchmen have constructed open sheds in pastures. A section of a simple type of shed is shown in Figure 5. The construction of bays 7 feet long is very desirable for this type of shed. The number of bays so constructed, of course, depends on the length desired or number of cattle to be sheltered. If built in pastures it is not necessary that corrals or other fencing be used in connection with them. Cattle

¹ Acknowledgment is made to the Division of Agricultural Engineering, Bureau of Public Roads, for cooperation in supplying a large number of the drawings for this publication.

² The following bulletin illustrates and discusses a number of types of desirable barns for various classes of beef cattle: SHEETS, E. W., and KELLEY, M. A. R. BEEF-CATTLE BARNs. U. S. Dept. Agr. Farmers' Bul. 1350, 17 pp., illus. 1923.

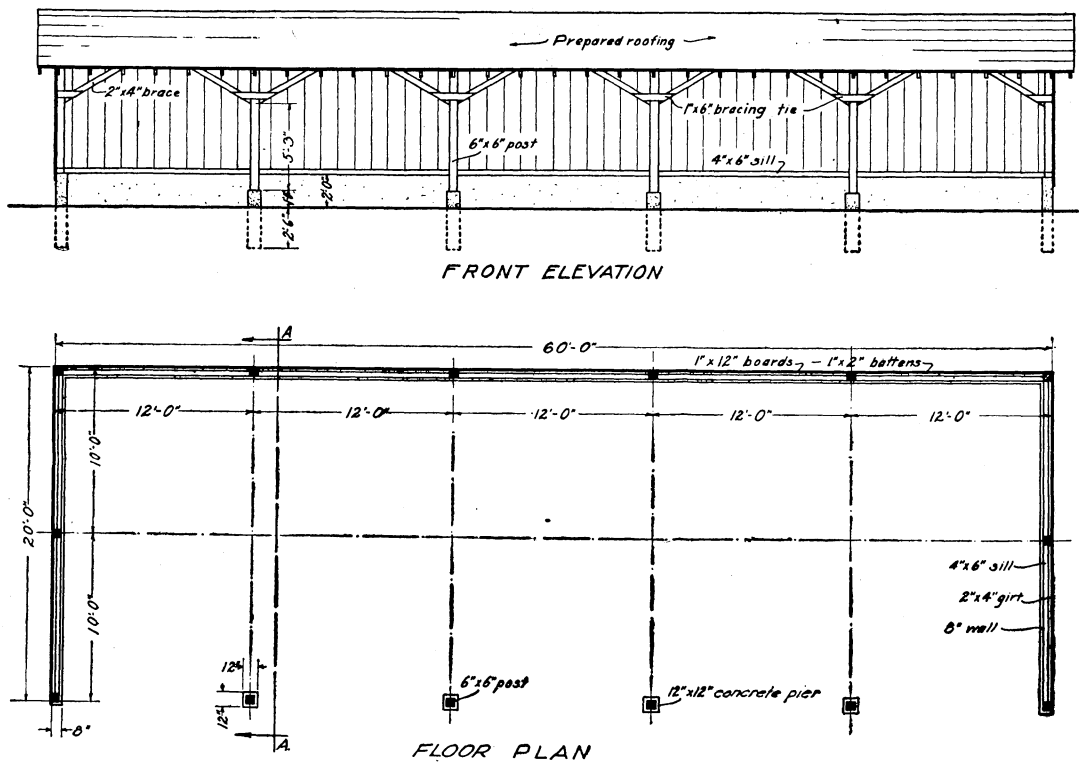


FIGURE 1.—Front elevation and floor plan of open shed (design No. 2198)

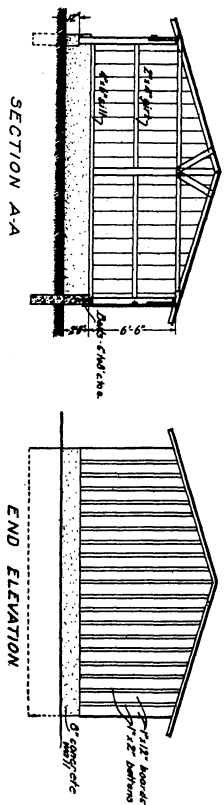


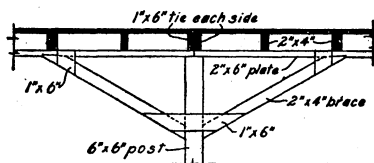
FIGURE 2.—Cross section and end elevation of open shed (design No. 2198)

will seek the shelter when needed. The ends and back of the shed should be closed. Sharp corners under the shed should be eliminated by rounding the corners or slatting across them at a 45-degree angle. The roofing of this type of shed may be of sheet metal or sheathing covered with good-quality prepared roofing. It is usually advisable to set posts in concrete, though good cedar and other suitable wood will last for many years if set in the ground. Almost any timber of sufficient strength, if properly treated with preservative, will serve.³

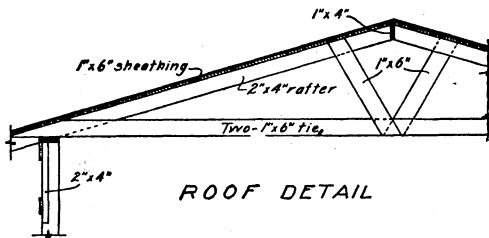
Sheds of this type are usually economical when their many uses are considered. In the more southerly areas they are sufficient for fattening cattle.

WINDBREAKS

On ranches that produce cattle for meat purposes in relatively large numbers, especially in the colder climates, windbreaks are constructed to afford protection from disagreeable winds. They are especially desirable in pastures that are used for winter grazing, where little or no natural protection is afforded. A suitable windbreak may be built in the form of a board wall 8 feet high. A lower wall will furnish less protection. The framework may be of 6-inch posts set 3 feet in the ground and 2 by 4 inch scantlings nailed horizontally. The posts should be about 7 feet apart and 2 by 4 inch scantlings 14 feet long should be used. The remainder of the material will be 1 by 12 inches by 8 feet, set perpendicularly. The length may be as desired. It is very important that the construction be strong enough to prevent blowing down. The windbreak should be placed at right angles to the prevailing winds.



BRACING DETAIL



ROOF DETAIL

FIGURE 3.—Bracing and roof detail of open shed (design No. 2198)

SELF-FEEDERS, FEED TROUGHS, AND HAYRACKS

Most cattle are hand fed. Self-feeders have been used chiefly with young growing stock, and the use of self-feeders is increasing somewhat in the fattening of cattle for market. Such equipment should be used with care, however, since the early part of the feeding period is perhaps the most critical time in the fattening process. It is very essential that fattening feeds be given gradually, and this can be controlled to better advantage if the animal is fed two or three times a day rather than allowing it access to an unlimited supply of

³ Farmers' Bulletin No. 744, Preservative Treatment of Farm Timber, contains information on this subject.

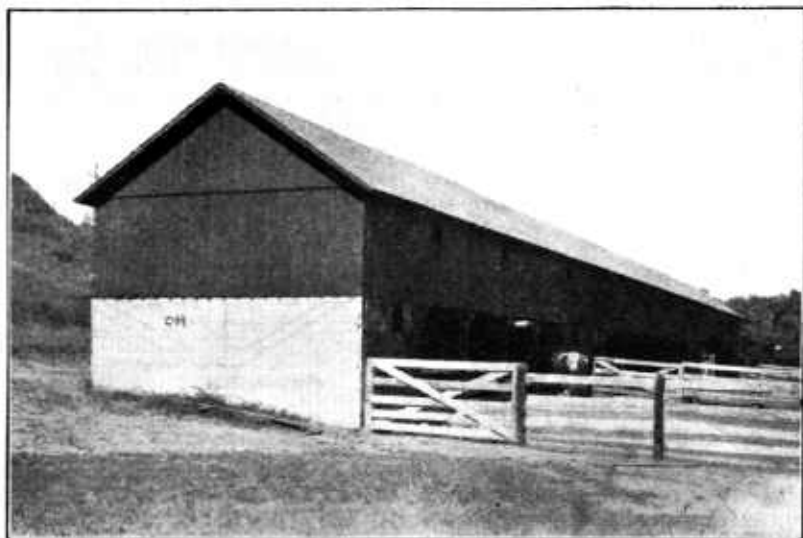


FIGURE 4.—A popular type of shed in the colder regions. Provision is made for storage of hay or other roughage in the upper part

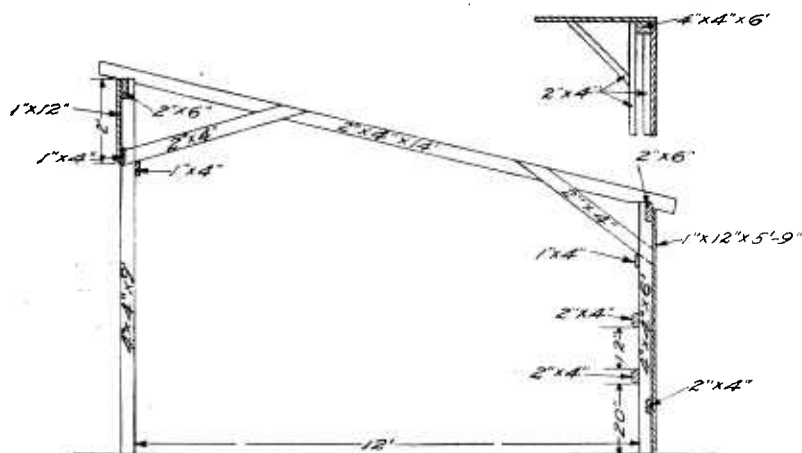


FIGURE 5.—Cross section of shed for use on the range

feed in a self-feeder. After the cattle are on full feed very little difficulty should be experienced with the self-feeder. Plans for a self-feeder are shown in Figure 6.

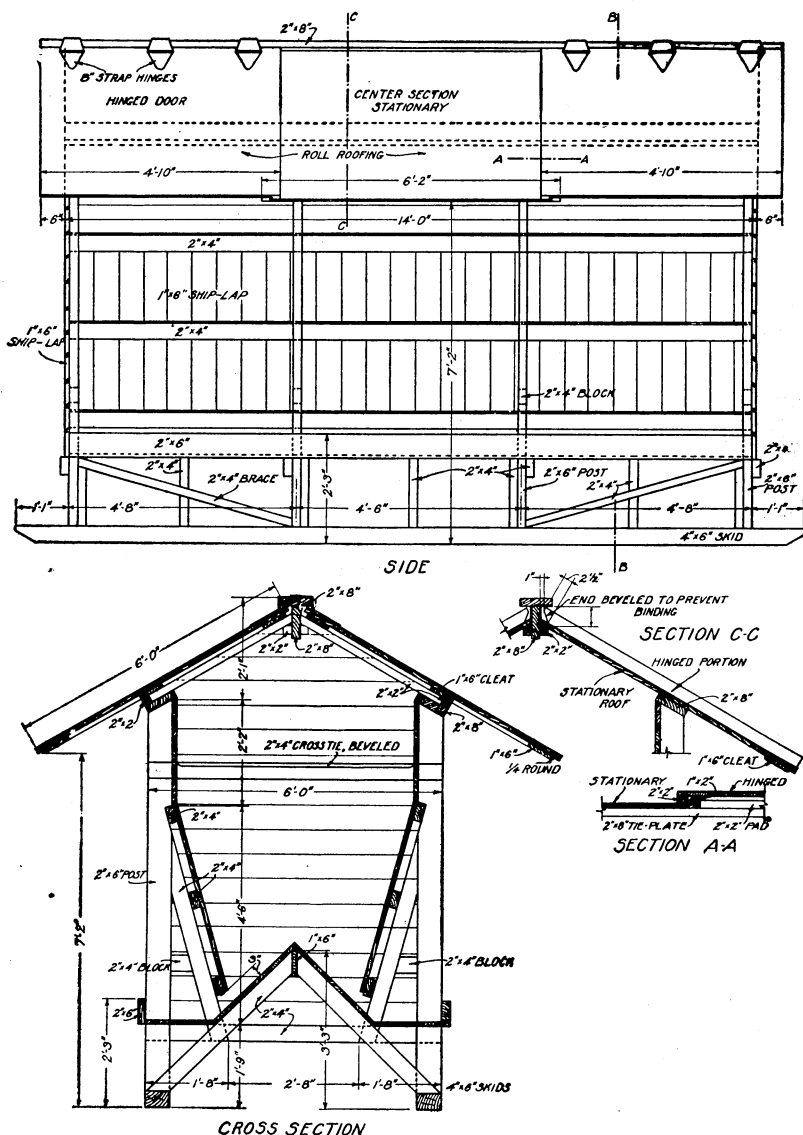
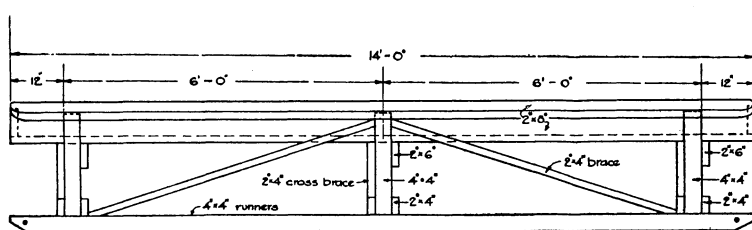


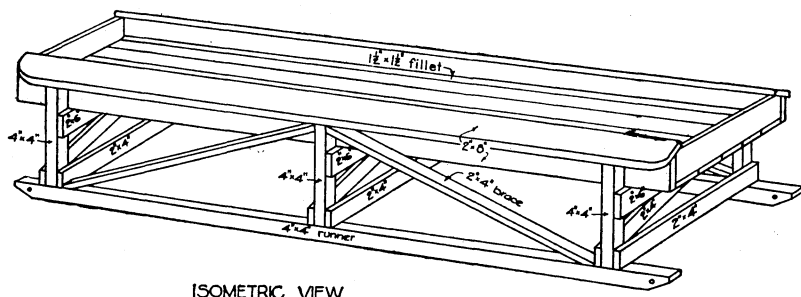
FIGURE 6.—A portable self-feeder (design No. 2192)

A portable feed trough is shown in Figures 7 and 8. This trough has several desirable features. It is strong, being well braced, has no sharp corners, and is constructed so as to prevent cattle from throwing feed from the trough. Troughs mounted on skids are easily moved from place to place. Many cattle feeders use such

a trough in the dry lot during the winter and on pasture during the grazing season. Stationary troughs should be placed in a well-drained place and preferably on pavement. The pavement should extend out several feet each way from the trough, permitting the



SIDE ELEVATION



ISOMETRIC VIEW

FIGURE 7.—A well-constructed, portable feed trough (design No. 1173)

cattle to have ample space to stand on it while eating from the trough.

Most cattle feeders feed hay or other dry roughage under cover. However, when the simpler types of sheds are used, and only for shelter, hayracks in the open are resorted to. As in the case of the feed troughs, there is an advantage in using a portable rack. Figures 9 and 10 show a rack that should meet the needs of most cattle feeders.

WATERING TANKS AND TROUGHS

Concrete tanks are used almost exclusively for storage of water for feed-lot use. Wells are depended on in most instances for the supply, and windmills or gas engines furnish the power for filling the tanks and troughs with water. Concrete tanks⁴ are usually made round or rectangular. (Fig. 11.) Round tanks are desirable when a large quantity of water is to be stored, as less material for construction is required for a given capacity than for the rectangular or

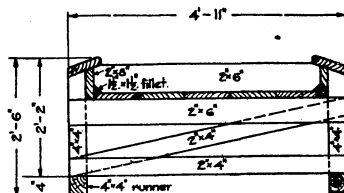


FIGURE 8.—Sectional view of feed trough (design No. 1173)

⁴ The following bulletin gives details of the construction of concrete watering troughs and tanks: BETTS, M. C., and MILLER, T. A. H. SMALL CONCRETE CONSTRUCTION ON THE FARM. U. S. Dept. Agr. Farmers' Bul. 1480, 38 pp., illus. 1926.

square types. Rectangular tanks and troughs permit greater numbers of stock to drink at one time than square ones of like capacity. Round tanks may be reinforced more satisfactorily than other types, but the forms are more difficult to build.

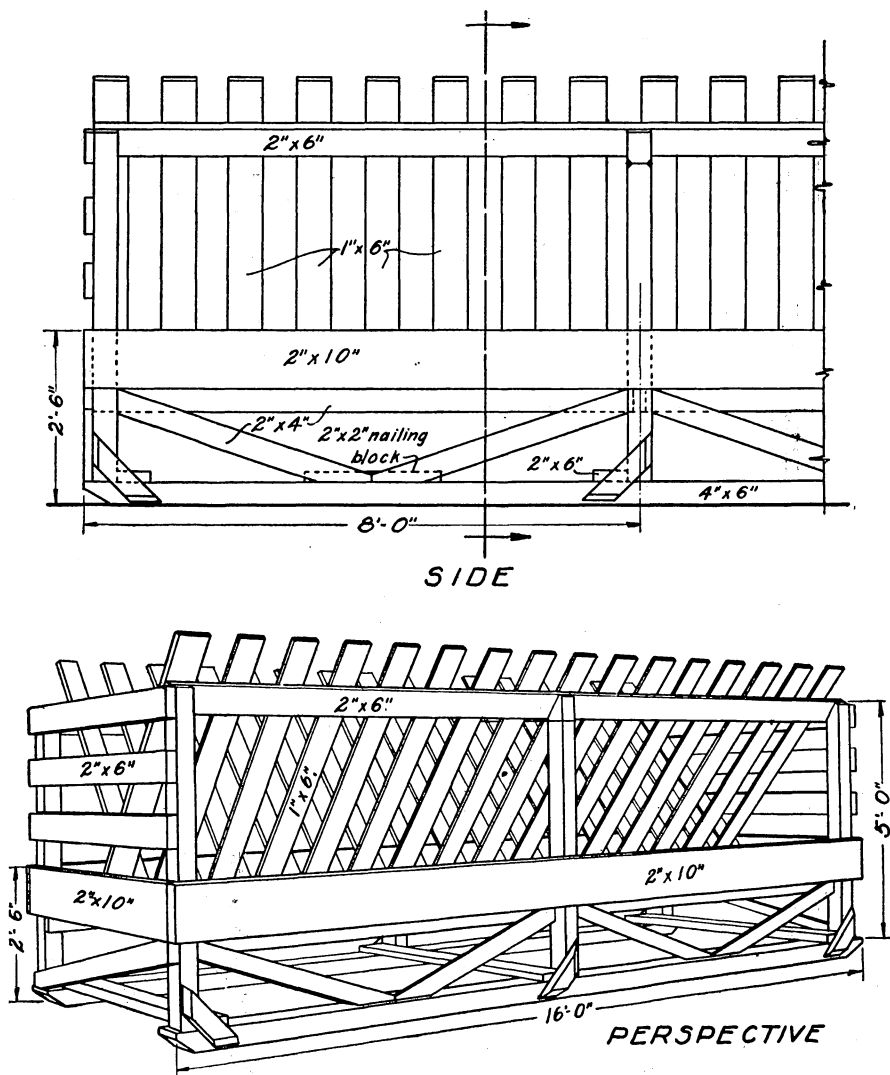


FIGURE 9.—Desirable type of rack for dry roughage (design No. 2199)

On the ranges wells, springs, streams, and dirt tanks or reservoirs constructed to catch the rainfall are the usual sources of the water supply.⁵ Various combinations of the above units of supply often

⁵ PARR, V. V. BEEF-CATTLE PRODUCTION IN THE RANGE AREA. U. S. Dept. Agr. Farmers' Bul. 1395, 44 pp., illus. 1925. This bulletin gives a complete discussion of the water supply for range conditions.

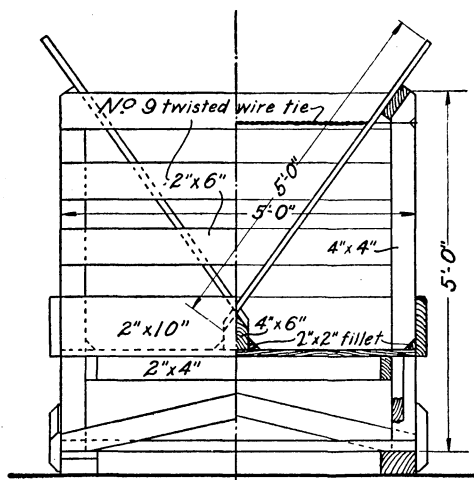
occur within a relatively small ranching area or on a single ranch. A ranchman has little choice in determining his water supply, as the source available is the influential factor. On many ranches dirt tanks, which have caught the rainfall, supply most of the water. In some instances the tanks are surrounded by fences and the water is piped through the tank to a watering trough as shown in Figure 12. Float valves are used to control the flow of water in such instances.

When wells are used as a source of supply, windmills are the most commonly used power unit. In some instances gas engines are installed in addition to windmills. The water is pumped directly into the trough. In other instances, particularly in the semiarid areas in the Southwest, a common arrangement is to have the water pumped

into steel tanks, dirt, or impervious reservoirs and piped to troughs. Supplies of this kind are constructed in various sizes, usually ranging from 20 to 100 feet in diameter and from 4 to 8 feet deep.

It is advisable to have an abundant supply of fresh water available at all times. Fattening cattle will consume from 5 to 10 gallons of water a day. For 2-year-old steers provision should be made to have at least 10 gallons available per head per day. Cattle will not consume a sufficient amount of water during the winter if compelled to drink it ice cold. Some

suitable heating device should be installed in cold climates to keep the water above freezing point. There are a number of satisfactory tank heaters on the market.



CROSS SECTION

FIGURE 10.—Sectional view of hayrack (design No. 2199)

FEEDING FLOORS⁶

In dry-lot feeding, particularly in the winter and spring months, it is important to have the troughs or bunks on a hard surface, preferably pavement. (Fig. 13.) When the feed lot is equipped in this manner, cattle are kept cleaner, have more comfortable footing, enabling them to feed to better advantage, and the actual feeding can be done with greater ease. In addition to this there results a large saving of feed for hogs following the cattle. When grain is fed in the ration rather heavily, it is very advisable to have hogs follow the cattle. It is not uncommon in many years to find that any profit resulting from the cattle feeding may be attributed to the hogs which are handled in connection.

⁶ The following bulletin gives a complete discussion of the construction of feeding floors: BETTS, M. C., and MILLER, T. A. H. Op. cit.

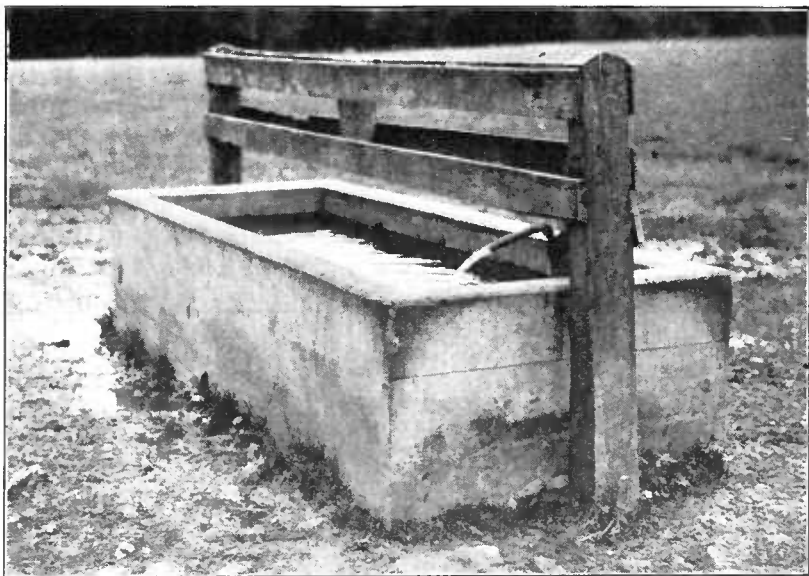


FIGURE 11.—Rectangular watering trough. Note the provision for keeping livestock out of tank

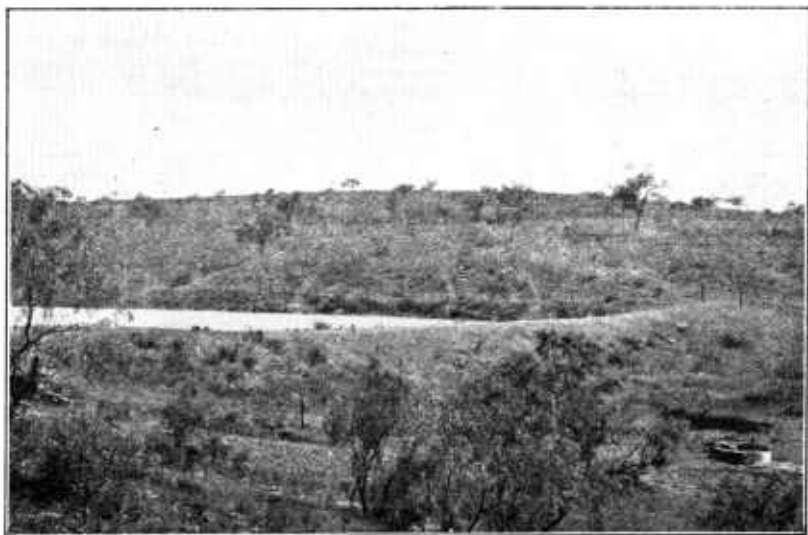


FIGURE 12.—The watering trough in the foreground is supplied from a dirt tank. The filling of the trough is controlled by a float valve

SILOS

Silos are an important part of feed-lot equipment in many beef-cattle production areas. Silage is particularly valuable for wintering beef cattle and for the fattening of cattle for market in areas where there are limited quantities of legume hays. There are three types of silos, the aboveground,⁷ the pit,⁸ and the trench. In most sections of the Corn Belt aboveground silos are used exclusively. In the semi-arid regions of the Southwest pit and trench silos are more common. In firm, clay soils, where there is no seepage, the trench silo and the pit silo are quite satisfactory.

The construction of the trench silo is less difficult than is the case with other types. Practically all the work can be done with ordinary

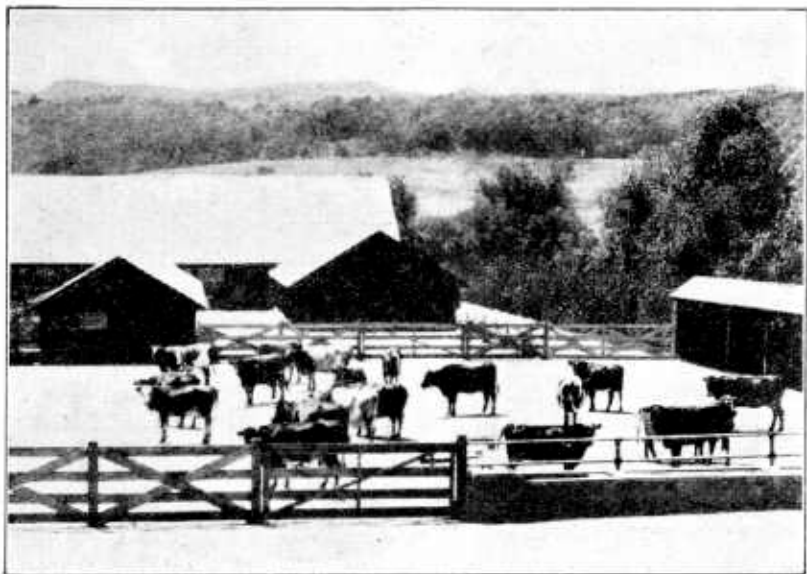


FIGURE 13.—Paved feed lot. The pavement keeps the cattle out of the mud and makes a very desirable feeding floor for hogs

farm labor. Most of the excavating can be accomplished with horses, plows, and a scraper such as a Fresno. The sides of the trench usually need to be smoothed up somewhat with a spade. The size of the trench is governed by the quantity of silage to be fed daily and the length of the feeding season. However, trench silos are seldom made over 10 feet in depth and 14 feet across the top. The sides should have some slope. Three inches per foot of depth should be satisfactory in the most suitable soils. Approximately 50 per cent more space is required in the trench silo for the storage of a given amount of silage than in other types, as the silage will not settle so compactly

⁷ RABILD, H., and PARKS, K. E. HOMEMADE SILOS. U. S. Dept. Agr. Farmers' Bul. 855, 55 pp., illus. 1917. (Revised ed.) This bulletin contains a description of many of the various kinds of aboveground silos.

⁸ METCALFE, T. P., and SCOTT, G. A. PIT SILOS. U. S. Dept. Agr. Farmers' Bul. 825, 14 pp., illus. 1917. This bulletin gives details of the construction of this type of silo.

in the trench. In feeding from the trench silo, a slice is taken off from top to bottom. The trench silo should be located on comparatively high ground, so that surface water will drain away. In filling the trench it is well to let the silage come considerably above the surface of the ground, and top off as one would round the top of a hay stack. This will make it possible to have a full trench of silage after settling. The silage should be covered, preferably with some kind of cheap roughage that has been moistened. In some areas where straw or other roughage is scarce, a layer of soil, about 1 foot in depth, is used for a covering, with satisfactory results.

SCALES AND SCALE PENS

Scales are a valuable piece of feed-lot equipment, as it is important in cattle feeding to know the weights of the cattle from time to time. Some of the most successful cattle feeders weigh the cattle every

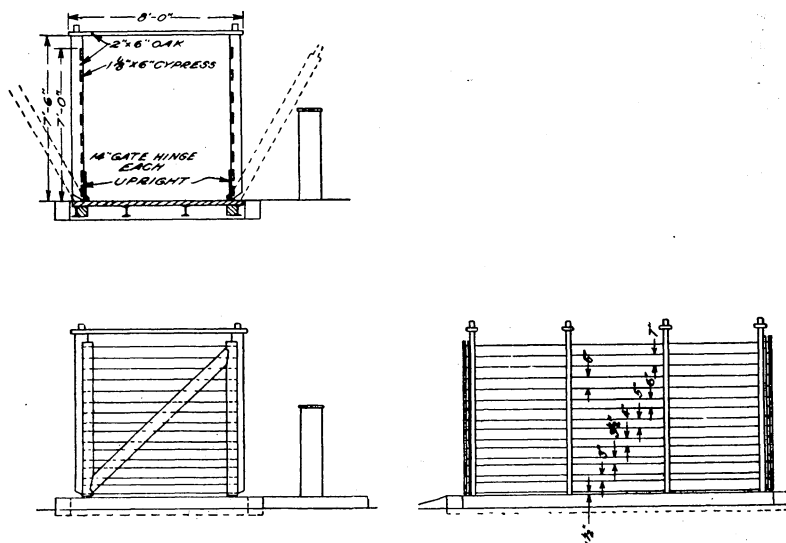


FIGURE 14.—Cross section of scale pen and side and end elevations. (Courtesy Iowa Agricultural Experiment Station)

month. The scales should be installed close to the feed lot and be constructed so that they may be used for weighing other stock and farm products. The scale pen should rest on the platform of the scales. Accurate weights can not well be obtained otherwise with groups of cattle, as cattle will crowd against the sides of the pens and this will influence the weight. A cross section and side elevation of a very satisfactory scale pen are shown in Figure 14.

With the increase in the system of buying feeder cattle directly from producers, scales are coming into wider use in the range country. Many feeders prefer to buy cattle by weight rather than by the head. At some shipping points railroad companies have installed scales, and others have been built jointly by a number of cattlemen.

DEHORNING AND BRANDING CHUTES

A chute for holding cattle is an important piece of equipment. It may be used for dehorning, castrating, or branding, and for administering other treatments.

In making a chute for holding cattle it is especially desirable in localities where branding is done to have one side movable so that the animal can be held snugly under pressure and without injury against the side of the chute. A branding chute so constructed

is known as a cattle "squeeze." (Fig. 15.) This type, aside from being useful in connection with branding, also has an advantage over the ordinary chute in castrating and vaccinating, as the animal can be held more firmly. Figure 16 is typical of the more common type of chute with the stationary sides. Plans for a desirable type of squeeze are shown in Figures 17 and 18.

In the dehorning of cattle it is essential to have the front of the chute so constructed that the head of the animal may be held absolutely firm. There are many designs in use which are satisfactory. Figures 19, 20, and 21 illustrate three types that are used by cattlemen. Specifications for each type are given in connection with the drawings.

In constructing branding chutes in connection with a set of corrals, it is advisable to arrange the chute so that branding fires may

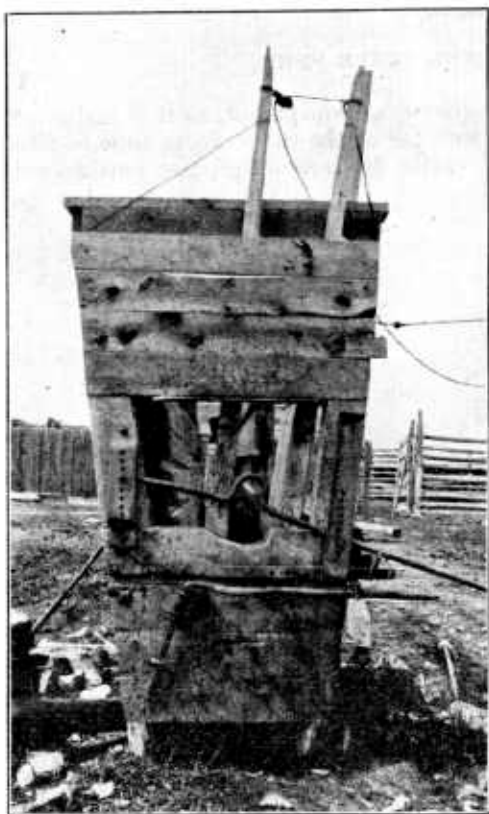


FIGURE 15.—A common type of branding and dehorning chute or "squeeze" in the range country

be built outside the corrals, also that the side of the animal to carry the brand will be toward the fires. In the set of corrals shown in Figure 22, the chute is arranged for branding on the right side of the animal. The arrangement may be reversed for branding on the left side. On ranches where comparatively small numbers of cattle are handled the largest pen shown in Figure 22 may be dispensed with and a wing extended from the gate to facilitate penning livestock.

⁹ BLACK, W. H. and PARR, V. V. DEHORNING, CASTRATING, BRANDING, AND MARKING BEEF CATTLE. U. S. Dept. Agr. Farmers' Bul. 1600. (In press.) This bulletin gives a complete discussion of the subject.

Other modifications of the plan shown may be made to add to the convenience of handling the stock.

CORRALS

Nothing in the way of equipment or improvement adds more to the ease and pleasure of handling cattle than a convenient system of well-constructed corrals. A suggested system is shown in Figure 22.

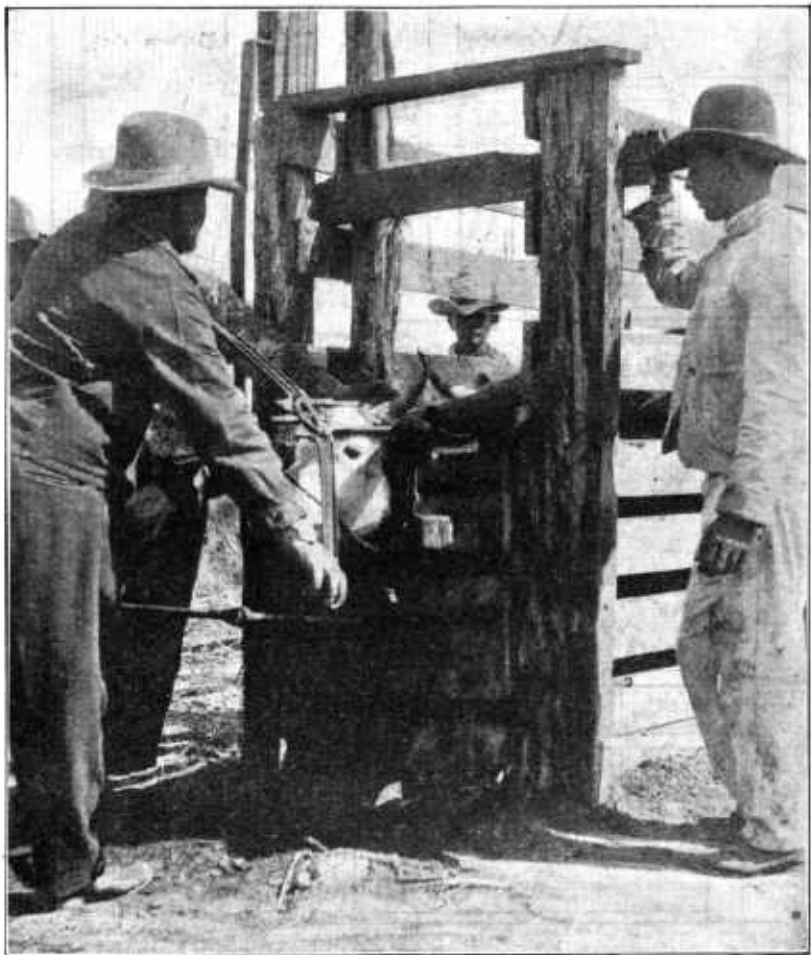


FIGURE 16.—Typical dehorning chute with stationary sides

It is not presumed that each operator will have need for the same-sized system of corrals nor will each individual's ideas of layout conform to a single plan. Certain salient features in planning a system of corrals should be observed, however.

Corrals should be conveniently located with respect to getting cattle into them. It is well to avoid long drives, if possible. Many ranchmen build corrals easily accessible from several pastures. In addi-

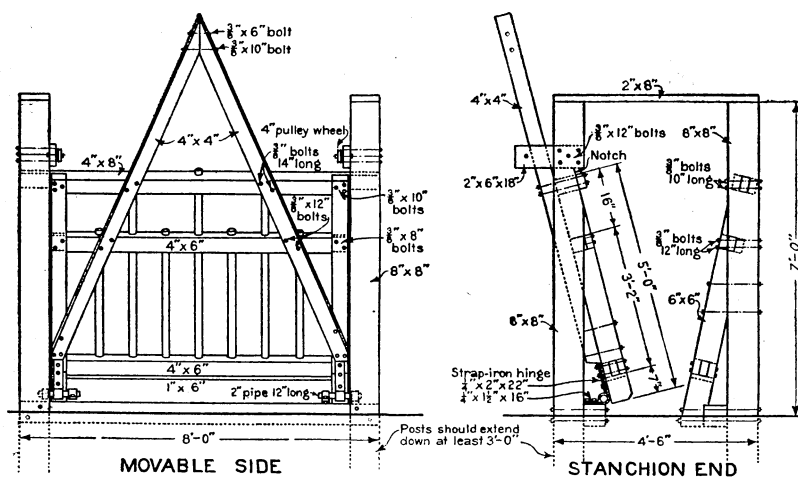


FIGURE 17.—Movable side and stanchion end of cattle "squeeze" (design No. 2197)

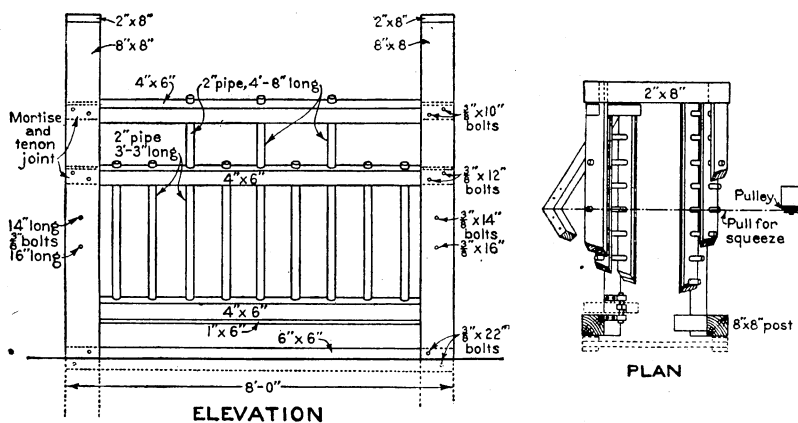


FIGURE 18.—Stationary side and plan of cattle "squeeze" (design No. 2197)

tion, small pastures, or "traps," are commonly found in connection with the system of corrals. Watering places in close proximity to or within the corrals are desirable. A trap may inclose a watering place. Getting cattle into the corral can be facilitated by constructing a wing leading out from a corner, as suggested in Figure 22.

Even though the number of cattle to be handled is small, it is advisable to construct a system of corrals of two or more pens to permit "cutting" or separation of classes of cattle when desired. In a large system, a cutting alley as shown in Figure 22 is a convenient arrangement. Cutting cattle is at least a two-man job regardless of the facilities. Two men working in an alley, built as shown in the figure, can handle cattle easily and effectively. This system is used at all public stockyards.

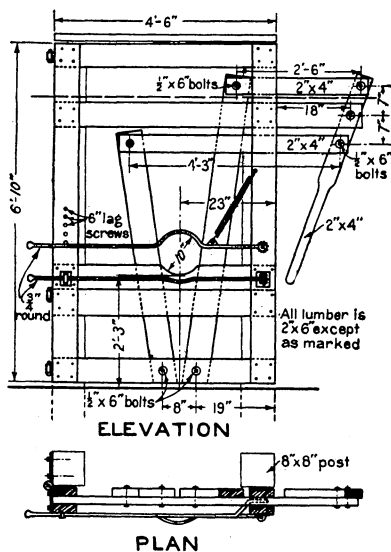


FIGURE 19.—Stanchion-gate type A. In this type the head is held in position by a curved iron rod passing over the nose and a similar one above the neck just back of the head

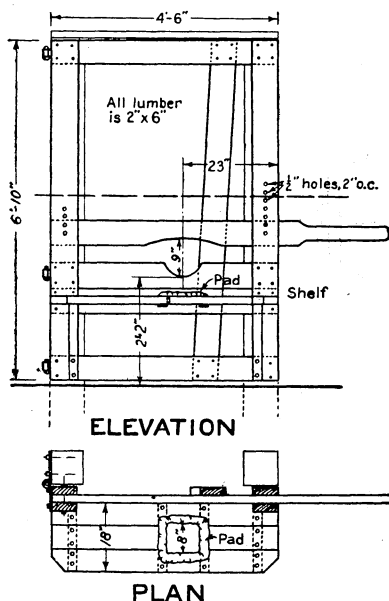


FIGURE 20.—Stanchion-gate type B. In this type the nose is placed in a hole and held there by a bar pressing downward against the top of the neck

Very conveniently arranged cutting chutes are found on some ranches. The ground plan of an efficient arrangement of cutting gates is shown in Figure 23. At point A shown in the diagram is a stop gate which swings to the right or left to allow or prevent further progress of cattle as they enter from point D. The cutting gates are operated from an overhead platform. Each gate is fitted with a handle as shown in Figure 24 (side view of cutting gate and also on the title page). Two men are required to operate the stop gate and cutting gates. The stop gate may be operated from an overhead platform or a side platform on the ground. As an animal is allowed to pass the stop gate it may be cut to the right, left, or straight ahead by proper manipulation of gates B and C. Many advantageous details may be incorporated in the construction of stop and cutting

gates as shown in Figure 23. Gates of these kinds should be well constructed and must be hung in such manner that they can be operated easily.

In constructing corrals such units as cutting, branding, and de-horning chutes and dipping vats may be built into the system. Complicated systems of chutes or other construction should be avoided.

The extensive use at present of motor trucks makes it advisable to construct docks for loading and unloading livestock. Trucks are being used to advantage in transportation of such classes of livestock as calves and young bulls in the range area. Such a loading dock is usually connected with the corrals. (Fig. 22.) The construction is simple and the dimensions required may be determined from the height and width of the truck body being used. Probably the greatest precaution to be exercised is to allow sufficient slope to the platform approach. Cleats nailed across the approach will lessen the probability of an animal's falling.

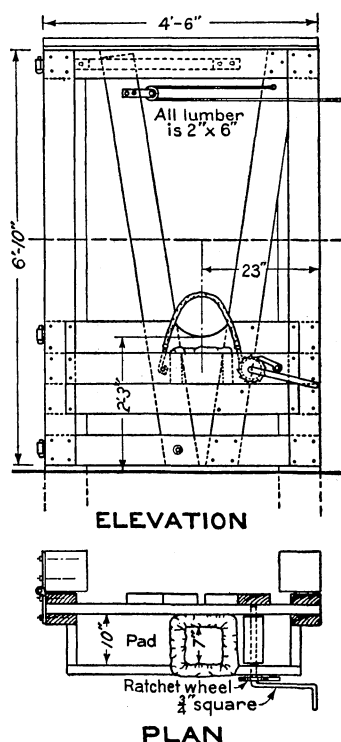


FIGURE 21.—Stanchion-gate type C. In this type the head is held down by means of a rope or chain over the neck and connected with a pulley and ratchet. The nose is held the same as in Figure 20

DIPPING VATS ¹⁰

Where it is necessary to dip large numbers of cattle, as is the case in many sections of the range country, it is advisable to have the type of vat shown in Figure 25. On farms where only small numbers of cattle are handled a cage or elevator type of vat is quite satisfactory. (Figs. 26 and 27.) The cost of the latter is considerably under that of the large-type vat and less dip is required to permit complete immersion. The cage type is particularly advantageous where cattle have to be held in dip at certain temperatures for several minutes.

CATTLE GUARDS

In many sections of the range country highways are not confined to section lines, as is common in the Corn Belt, but run through ranches diagonally or otherwise. In instances of this kind, cattle guards are used between ranches or certain pastures of the same ranch. The guards are constructed so that automobiles can pass over them, but

¹⁰ The following bulletin gives details of the construction of dipping vats and concrete water heater, for use in heating dip when required: BETTS, M. C., and MILLER, A. A. H. Op. cit.

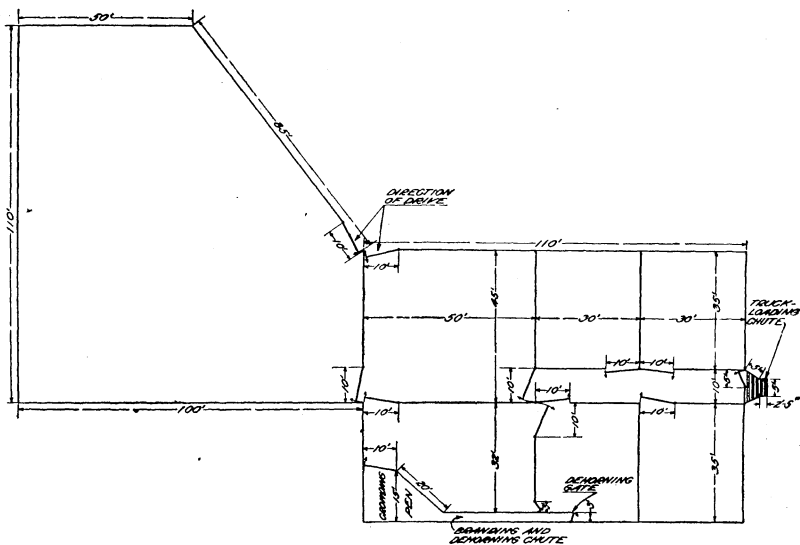


FIGURE 22.—A convenient system of corrals

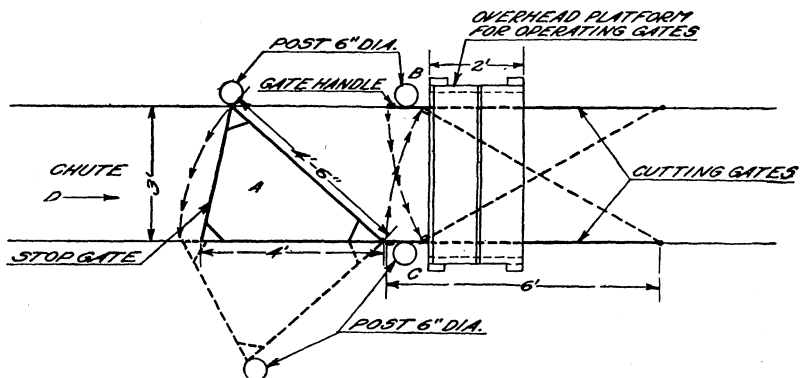


FIGURE 23.—Ground plan of stop gate and cutting gates

prevent cattle from crossing. Cattle guards (fig. 28) for private use only are recommended on large ranches, for there are many occasions when automobiles are useful in reaching the various parts of the ranch. The installation of cattle guards saves much time under these circumstances. Figure 29 shows a plan for a type similar to the one illustrated in Figure 28, the main difference being the arched position of the crossbars as shown in the end view of Figure 29. The arched position eliminates part of the excavation necessary with the one shown in Figure 28. In making either of these cattle guards, if 2 or 2½ inch pipe is not available, 2 by 4 scantlings set on edge may be used.

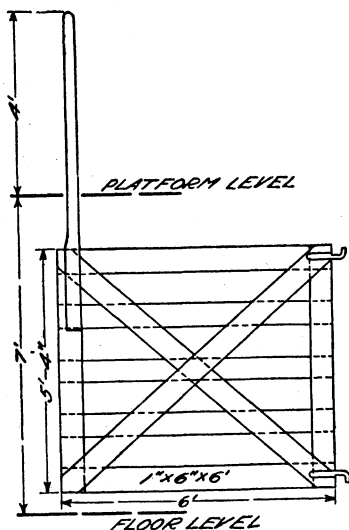


FIGURE 24.—Gate used in a system of cutting gates operated from above

Another type of cattle guard is shown in Figure 30. This is simple in construction and very satisfactory. A track or trough constructed over a pit to accommodate the wheels of the automobile constitutes the make-up of such a guard. Where cattle guards are installed, gates are also placed in the fence close by for the accommodation of those not traveling in motor vehicles.

are installed, gates are also placed in the fence close by for the accommodation of those not traveling in motor vehicles.

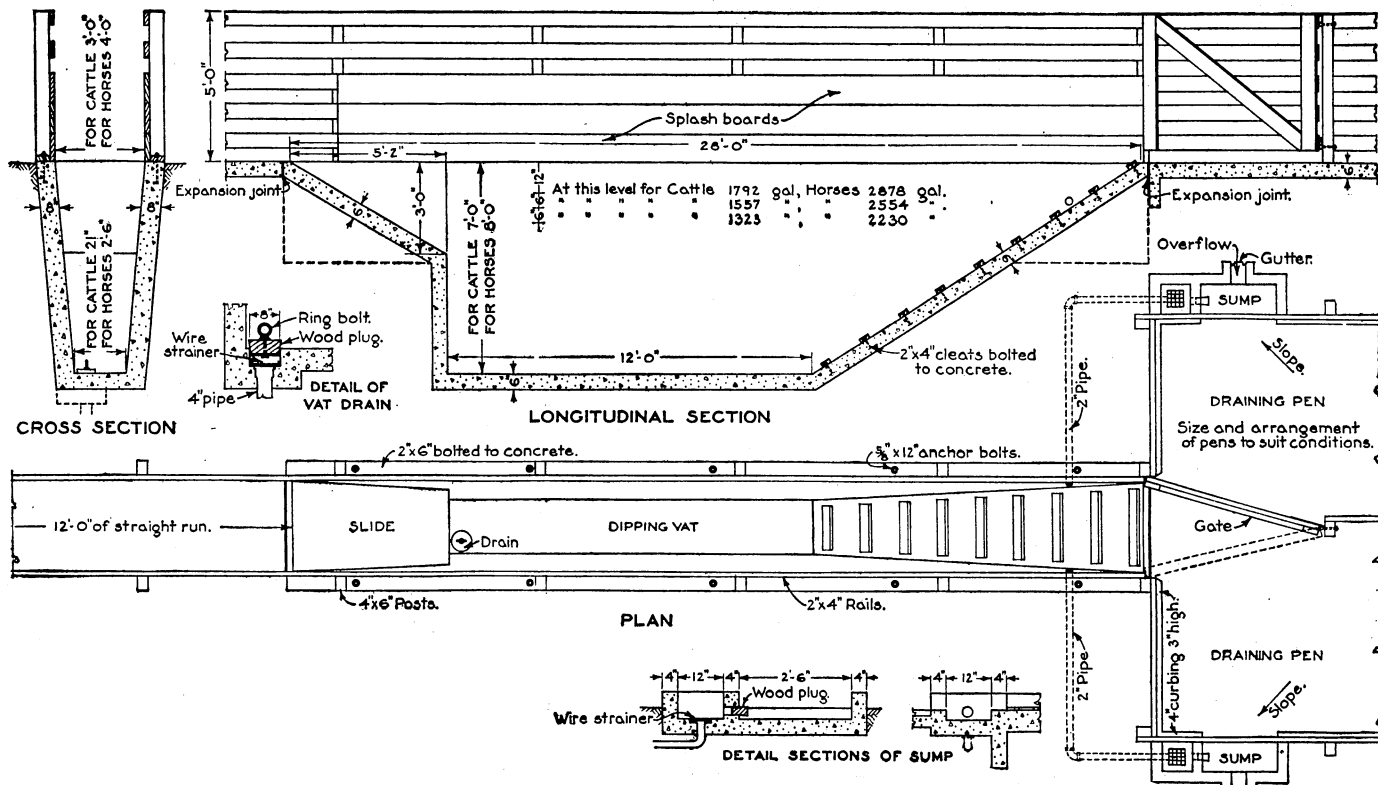


FIGURE 25.—Desirable type of dipping vat, especially for range conditions (design No. 1835)

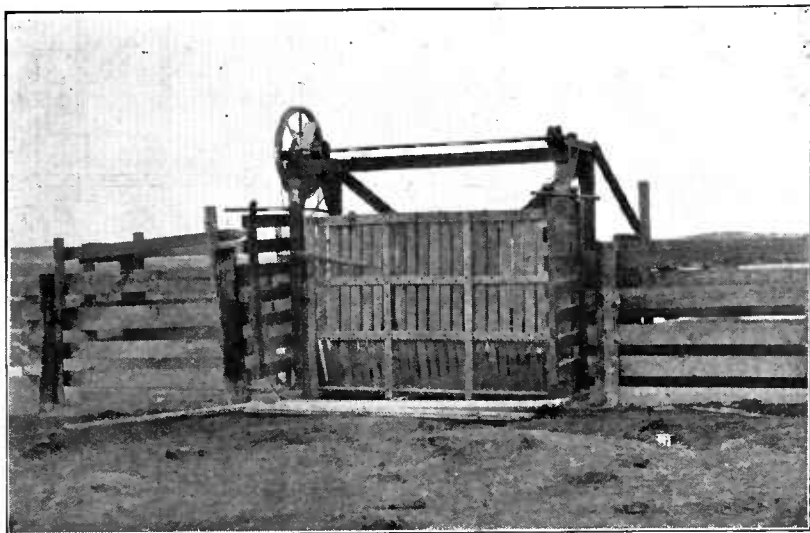


FIGURE 26.—Individual dipping vat showing crate in position for lowering, which is usually performed by the use of a brake

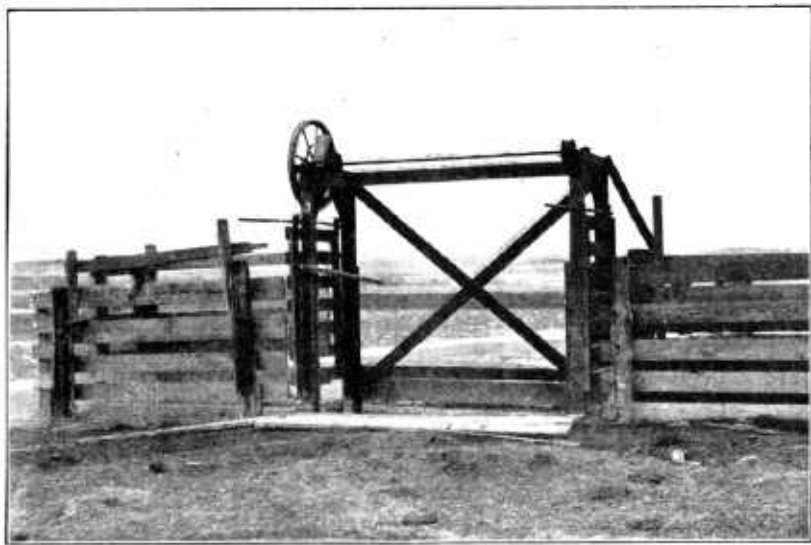


FIGURE 27.—Individual dipping vat with crate lowered. The crate is raised by a horse

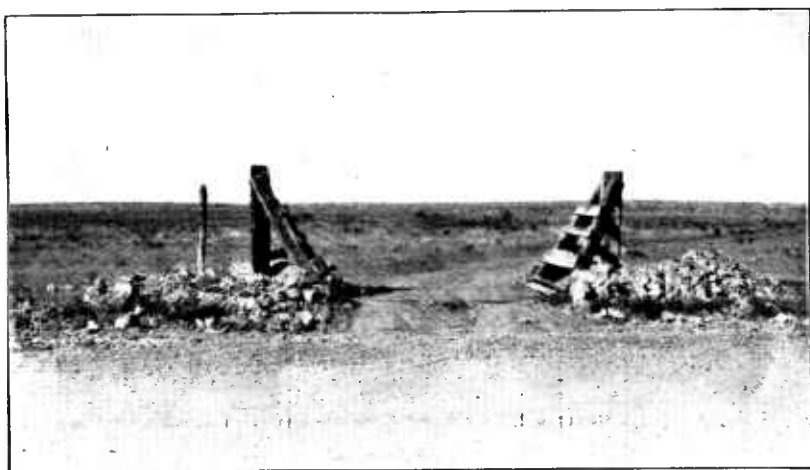


FIGURE 28.—Cattle guard at entrance of ranch from public highway

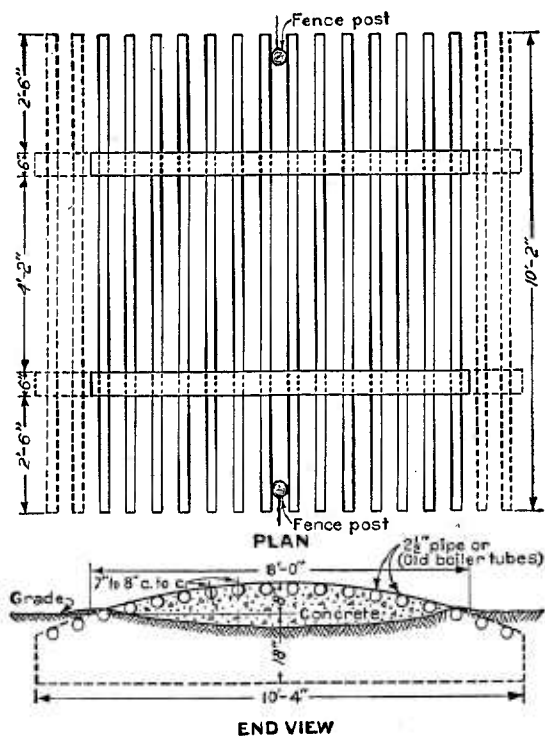


FIGURE 29.—Plan and end view of cattle guard (design No. 1951)

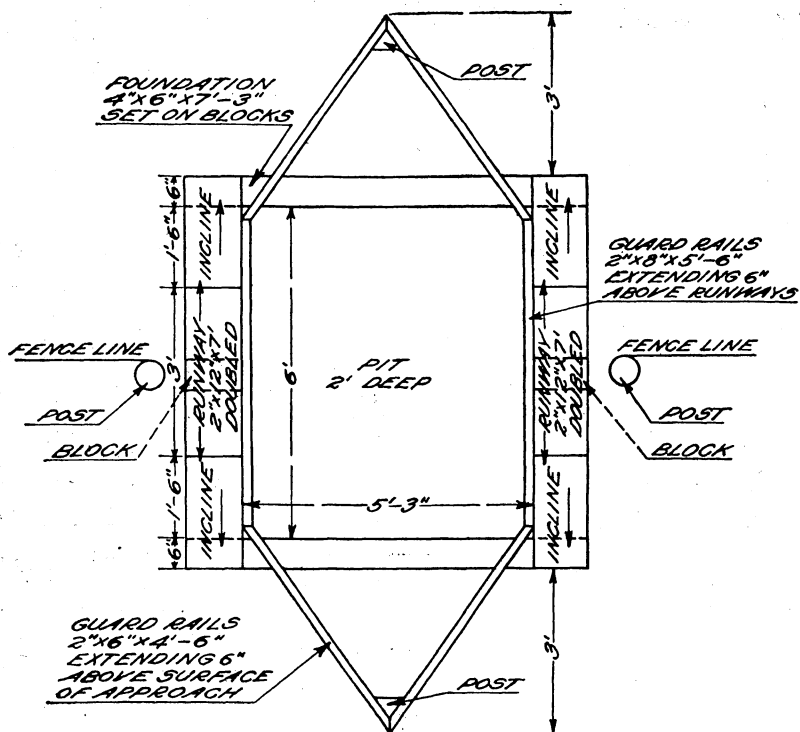


FIGURE 30.—Plan of an inexpensive yet effective cattle guard

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